

Hawaii Mac Facts

Control of Rat Damage in Macadamia Nut Orchards

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Recent studies indicate that rats damage more than 5% of the annual macadamia nut crop in Hawaii. In spite of their impact, little is known about these pests in and around orchards, and few methods are available for controlling damage.

The U.S. Department of Agriculture's Animal and Plant Health Inspection Service maintains a research facility in Hilo to develop, evaluate, and improve methods of controlling rodent damage to Hawaiian agricultural crops, and to develop biological and ecological data needed for effective use of new and existing control methods. The Hilo Field Station is a unit of the Denver Wildlife Research Center (DWRC), the federal organization responsible for wildlife damage control research in the United States. Work at the Hilo facility focuses on sugarcane and macadamia nuts. Previous efforts at the laboratory led to the registration of zinc phosphide for use in these two crops.

The Hilo staff currently is involved in a number of laboratory and field studies to learn more about the control of rats in macadamia nut orchards. They recently completed a 2 year cooperative project with Mauna Loa Macadamia Nut Corporation to evaluate rodent trapping as a potential control method. Although this technique is labor intensive, it may be cost effective on small farms and for protecting high value crops such as macadamia nuts. More than 2,000 rats were captured in 4 orchard blocks of about 25 acres each during 2 years of trapping. Overall, damage was 61% less in the trapped blocks than in the untrapped reference blocks. The data are being analyzed to determine the cost

effectiveness of the program, and methods are being considered to reduce labor requirements. If feasible, traps could be used to control rat populations at any time during the crop cycle.

To learn more about rat activity patterns and their implications for controlling damage, the DWRC staff is also studying the nightly and seasonal movement of rats in orchards. Rats were fitted with collar radio transmitters and their movements monitored at various times during the day and night. Most rats remained in underground burrows during the day, emerged shortly after sunset to feed in macadamia nut trees, and returned to their burrows shortly before sunrise.

The rats moved freely among trees via

interlocking branches of the thick canopy: most spent very little time on the ground. None of the rats captured in the orchard was observed venturing into surrounding windbreaks or noncrop areas, although a few rats residing in windbreaks foraged in macadamia nut trees along the perimeter of the orchard. Nightly movements appear to be more extensive during peak anthesis than during peak harvest, perhaps in response to the reduced availability of nuts. The results of this study hopefully will help managers identify varieties most susceptible to rat damage and determine the optimum timing and placement of rodenticide baits, traps, or other control measures in their orchards. Zinc phosphide is the only toxicant registered for controlling rats in macadamia nut orchards. However, results of operational baiting programs are often inconsistent. A major objective at the Hilo lab is to find more effective methods for using agricultural rodenticides. Routine laboratory feeding trials to evaluate candidate and registered rodenticides are conducted with each of the 3 species of rats present in Hawaii. Roof rats are the major pest in macadamia nut orchards; Norway rats and Polynesian rats cause extensive damage in sugarcane fields.

Producers interested in learning more about rodent control research at the DWRC Hilo Field Station can write to

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